# Kunal Kapila

Bachelor of Science, Mathematics and Scientific Computing
Double Major, Computer Science and Engineering

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## Education

- **Indian Institute of Technology, Kanpur**                    *2014 - 2019 (Expected)*
  Cumulative Grade Point Average 9/10

- **All India Senior School Certificate Examination (AISSCE)**
  Central Board of Secondary Education (CBSE), Govt. of India; Delhi Public School, R. K. Puram

  - 98.2% (School Topper) with National top 1% in Computer Science & Chemistry          *2014*
  - Cumulative Grade Point Average (CGPA) 10/10                    *2012*

## Academic and Co-Curricular Achievements

- Secured AIR 116 in **JEE Mains** 2014 amongst 1.5 million candidates

- Secured AIR 1306 in **JEE Advanced** 2014 amongst 150,000 candidates

- Secured Rank 29 in **ACM-ICPC Amritapuri** Onsite Round 2015 amongst 200 college teams that qualified for it

- Secured Rank 54 in **ACM-ICPC Amritapuri** Online Round 2015 amongst 1500 college teams

- **Microsoft Code.Fun.Do**

  - **Winner 2014-15**: Graphing app to plot implicit 2D Mathematical Functions for Windows Phone Platform
  - **National $5^{th}$, Coding Milestone, Finalist Forum 2014-15**: Educational app to teach students programming on the go for Windows Phone Platform; Implemented Scratchpad, Lessons & Daily Challenges
  - **Winner 2015-16**: Front-end for open source program simulation code for Microsoft Windows Store

- Qualified for & attended **International Olympiad of Informatics Training Camp** 2014

- **Kishore Vaigyanik Protsahan Yojna** Fellow 2013, Department of Science & Technology, Government of India

- **Junior Science Talent Search Examination** Scholar 2012, Directorate of Education, Government of Delhi

- **National Talent Search Examination** Scholar 2010, conducted by NCERT, Government of India

## Work Experience

- Development Intern, **IITK NYC Office**                    *MAY 2016 - current*
  *Supervisor: Prof. Manindra Agrawal, Department of CSE, IIT Kanpur*

  - Working on the backend of a scale-able web application using Scala with Akka
  - Refactored the core code base including the database schema to incorporate typesafe identifiers
  - Currently working on an efficient way of implementing history for editable items in a stream of objects

- Web Developer (Intern), **Elanic**, Bangalore                    *DEC 2015*

  - Full stack developer: MongoDB, AngularJS and NodeJS along with Restify framework
  - Built RESTful APIs for notification, engagement(likes, comments) and search (using Elastic Search) modules

## Projects

- **PhotoProof**: Cryptographic Image Authentication                    *JUN 2016 - current*
  *Supervisor: Prof. Nasir Memon, (Department Head) Department of CSE, NYU School of Engineering*

  - Understood the theoretical model for image authentication based on Proof-Carrying Data (PCD)
  - Currently working on a practical implementation of the idea described in the paper using libsnark's PCD

- **Cimulator**: a Visual & Interactive Tutoring system     *Click here for **Tutorial***          *MAY - JUL 2015*
  *Supervisor: Prof. Amey Karkare, Department of CSE, IIT Kanpur*          *Tested by 400 students in Fall 2015*

  - Interpreter for C language in python, modelled memory artificially, handled external header files & overflows
  - Prompts user with possible corrections for runtime errors instead of crashing abruptly (unlike gcc)
  - Web interface to **simulate C codes** that were interpreted by Cimulator to provide visual cues to the user

## Technical Skills

- **Languages**:
  C, C++, Python, Scala

- **Web Development**:
  HTML, CSS, Javascript, Bootstrap, PHP, Node.js (with Express, Restify), AngularJS, MySQL, MongoDB

- **Tools**:
  LaTeX, Git, Vim, OpenGL, SDL, Octave, iPythonNotebook

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# Course Projects

- **Animation Movie** *OCT - NOV 2015*
  *Supervisor: Prof. Vinay P. Namboodari, Department of CSE, IIT Kanpur*

  - Rendered a 3-minute movie clip using **OpenGL** (Graphics Library), **SDL** (Simple DirectMedia Layer)
  - Implemented Keyframe animation, DeBoor's B-Spline Interpolation, Texture Mapping, Lighting, Physics-based collision detection, Dynamic Programming and integrated audio

- **Randomness Certification using Quantum Non-Locality** *FEB - APR 2016*
  *Supervisor: Prof. Rajat Mittal, Department of CSE, IIT Kanpur*

  - Understood Bell inequalities, EPR Paradox and studied classical and quantum strategies for non local games for the CHSH game
  - Studied how non local correlations of quantum states can be used to generate certified randomness
  - Click **here** to view the final project report

- **Students' Gymkhana Form Automation** *MAR - APR 2016*
  *Supervisor: Prof. Sumit Ganguly, Department of CSE, IIT Kanpur*

  - LAMP stack based Web application to automate the Senator Seed Fund(SSF) Form
  - Authentication based system to propose, approve and reject SSF forms
  - Manages role based user groups and permissions

# Relevant Courses Undertaken

| Mathematics | Mathematics I (Functional Analysis) | Mathematics II (Linear Algebra) |
|---|---|---|
| | Probability & Statistics | Mathematical Logic |
| | Abstract Algebra | Commutative Algebra (*) |
| | Real Analysis | Introduction to Fourier Series (*) |
| | Complex Analysis | Several Variable Calculus (*) |
| **Computer Science** | Fundamentals of Computing (A*) | Data Structures and Algorithms (A*) |
| | Algorithms II (*) | Theory of Computation (*) |
| | Modern Cryptology | Quantum Computing |
| | Principles of Database Systems | Introduction to Computer Graphics |
| **Others** | Introduction to Economics (A*) | Introduction to Philosophical Logic |

(A*) Awarded for exceptional performance          (*) Courses in Progress

# Positions of Responsibility

- **Coordinator, Programming Club**, Science and Technology Council, IIT Kanpur *MAR 2016 - current*

  - Currently the Coordinator of the Programming Club of IIT Kanpur, one of the the largest student programming community of India, managing a team of 20 secretaries.
  - Conducted several lecture series, workshops and competitions on Algorithmic Programming, Open Source Development, and Web Development for students of the campus community
  - Organised the summer camp and mentored over 60 students who completed projects in the field of Web & App Development, Augmented Reality, Machine Learning, Computer Vision and Ethical Hacking

- **Head Web, Antaragni**, Students' Gymkhana, IIT Kanpur *MAR 2016 - current*

  - Conceptualised and designed the website for Antaragni 2016 (*http://antaragni.in/*)
  - Implemented NodeJS server with Express framework, along with MongoDB & AngularJS
  - Dynamically rendered the events, contacts, sponsors page and schedule from the database

- **Student Member, Senate Undergraduate Committee (SUGC)**, IIT Kanpur *(2014-15) & (2015-16)*

  - Amongst the **4** student members responsible for representing the opinions of more than 3500 undergraduate students in campus on academic matters in SUGC, a standing committee of the Institute Senate
  - Worked on proposals like remedial programme for academically deficient students, Undergraduate Teaching Assistants & Lateral Entry for Bachelors programme in Physics, Chemistry and Mathematics